EVOLUTION

INTERNATIONAL JOURNAL OF ORGANIC EVOLUTION

Volume XII, 1958

Published Quarterly

At Prince and Lemon Streets, Lancaster, Pa.

By the

Society for the Study of Evolution

MAR 5 1959

TABLE OF CONTENTS

NUMBER 1, MARCH

A Reevaluation of the Derivation of *Quercus margaretta* from *Quercus gambelii*. JOHN M. TUCKER and CORNELIUS H. MULLER 1
Dependence of the Adaptive Values of Certain Genotypes in *Drosophila pseudoobscura* on the Composition of the Gene Pool. HOWARD LEVENE, OLGA PAVLOVSKY and THEODOSIUS DOBZHANSKY 18
The Beginnings of Nomadic and Group-predatory Behavior in the Ponerine Ants. E. O. WILSON 24
Experimental Studies of Mimicry in Some North American Butterflies. Part 1. The Monarch, *Danaus plexippus*, and Viceroy, *Limenitis archippus*. JANE VAN ZANDT BROWER 32
The Niger, the Volta, and the Dahomey Gap as Geographic Barriers. A. H. BOOTH 48
Evolution and Variation in Trillium. II. Variation in Some External Characters Observed in Natural Populations of *Trillium kamtschaticum* Pall. KAZUKO SAMEJIMA 63
Sexual Isolation and Variation in Mating Behavior within *Drosophila athabasca*. DWIGHT D. MILLER 72
Hybridization in Some Species of *Pteris* L. TREVOR G. WALKER 82
Studies on Competition in Plant and Animals. IX. Experimental Studies on Migration in *Drosophila melanogaster*. KAN-ICHI SAKAI, TAKASHI NARISE, YUICHIRO HIRAIZUMI and SHIN-YA IYAMA 93
Studies on Blood Groups in the American Bison (Buffalo). D. OWEN, C. STORMONT and M. R. IRWIN 102
Notes and Comments
The Concept of Ecologic Niche, with Reference to the Theory of Natural Coexistence. JAY M. SAVAGE 111
Further Comments on Niches and Natural Coexistence. HERBERT H. ROSS 112
The Comparison of Observed and Calculated Zygotic Distributions. BRUCE WALLACE 113
Haplodiploidy in the Diaspididae—Confirmation of an Evolutionary Hypothesis. SPENCER W. BROWN 115
The Caudal Fin as a Hydrofoil. J. R. NURSALL 116
Report on the Twelfth Annual Meeting of the Society for the Study of Evolution. HARLAN LEWIS 120

NUMBER 2, JUNE

Experimental Studies of Mimicry in Some North American Butterflies. Part II. *Battus Philenor* and *Papilio troilus, P. polyxenes,* and *P. glaucus*. JANE VAN ZANDT BROWER 123
Cytotaxonomic Studies on the Fern Genus *Pellaea*. ALICE F. TRYON and DONALD M. BRITTON 137
A Differentiation Index, and a New Measure of Evolutionary Rates. BJÖRN KURTÉN 146

A Mathematical Model for the Co-evolution of Obligate Parasites and Their Hosts. CHARLES J. MODE 158
Geographic Isolation and Phenotypic Constitution of Populations of *Lepidobatrachus asper,* a Neotropical Batrachian Inhabitant of Arid Regions. J. M. CEI 166
Chromosome Numbers and Evolution of the Genus *Colchicum.* NAOMI FEINBRUN 173
On Population Structure in Generalized Hunting and Collecting Populations. JOSEPH B. BIRDSELL 189
Problems of Cultural Evolution. JULIAN H. STEWARD 206
Recent Changes in the Introduced Population of the Fire Ant *Solenopsis saevissima* (Fr. Smith). E. O. WILSON and W. L. BROWN, JR. 211
The Significance of Floral Constancy Among Bees of the Genus *Diadasia* (*Hymenoptera, Anthophoridae*). E. G. LINSLEY and J. W. MACSWAIN 219
Evolution in Three Genera of Australian Frogs. A. R. MAIN, A. K. LEE, and M. J. LITTLEJOHN 224
Chromosomal Adaptive Polymorphism in *Drosophila persimilis II.* Effects of Population Cage Conditions on Life Cycle Components. ELIOT B. SPIESS 234
The Evolutionary Significance of Rare Matings in Animal Populations. JAMES E. MOSIMANN 246
Notes and Comments
Loons and Their Wings. ROBERT W. STORER 262
The Loon Wing. D. B. O. SAVILE 263
Crossing Relationships in the Genus *Carica.* ANAND C. SAWANT 263
Comments on the Origin and Phylogeny of the Angiosperms: Essay on the Origin of Angiosperms (M. G. POPOV); On the Hybrid Origin of the Angiosperms (G. LEDYARD STEBBINS). M. G. POPOV (posthumous) and G. LEDYARD STEBBINS 266
The Geographical Distribution of Vertebrates. RALPH GORDON JOHNSON 270

NUMBER 3, SEPTEMBER

Experimental Studies of Mimicry in Some North American Butterflies. Part III. *Danaus gilippus berenice* and *Limenitis archippus floridensis.* JANE VAN ZANDT BROWER 273
Evolution and Variation in Japanese Species of Trillium. MASATAKA KURABAYASHI 286
Relationships of Allopatric Populations of Spadefoots (Genus *Scaphiopus*). AARON O. WASSERMAN 311
Rapid Evolution in *Clarkia.* HARLAN LEWIS and PETER H. RAVEN 319
Evidence Suggesting a Hybrid Origin for Certain Leafhopper Species. HERBERT H. ROSS 337
Possible Origin of Dermal Temperature Regulation. RAYMOND B. COWLES .. 347
Balanced Polymorphism in *Tisbe reticulata,* a Marine Copepod. BRUNO BATTAGLIA 358
Tetrapod Limbs and Early Tetrapod Life. ALFRED S. ROMER 365
Comments on the Definition of Genera. ROBERT F. INGER 370

Genetics of Natural Populations XXVII. The Genetic Changes in Populations of *Drosophila pseudoobscura* in the American Southwest. THEODOSIUS DOBZHANSKY 385
Hybrid Vigor, Heterosis, and Evolution in *Paramecium aurelia*. R. W. SIEGEL 402
Notes and Comments
The Evolutionary Significance of the Scrotum. RAYMOND B. COWLES .. 417
Interaction Between Genetic Drift and Natural Selection. BRYAN CLARKE and MARK WILLIAMSON 418
Comment on "Interaction Between Genetic Drift and Natural Selection." THEODOSIUS DOBZHANSKY and OLAG PAVLOVSKY 419
Additional Notes on the Origin of Tetrapods. R. B. COWLES 419
Transatlantic Connections and Long-distance Dispersal. ASKELL LÖVE .. 421
Hybridization Between Dioecious Hermaphrodite Species in the Caryophyllaceae. H. G. BAKER 423

NUMBER 4, DECEMBER

Land Bridges and Ecology in Bat Distribution on Islands off the Northern Coast of South America. KARL F. KOOPMAN 429
Observations of the Ecology of *Paramecium*, with Comments on Species Problem. NELSON G. HAIRSTON 440
Evolution and Biogeography of the Aplodontid and Mylagualid Rodents. J. ARNOLD SHOTWELL 451
The Origin of Sexual Isolation between Different Lines within a Species. S. KOREF SANTIBAÑEZ and C. H. WADDINGTON 485
Studies on Heterozygosity and Homeostasis II. Loss of Heterosis in a Constant Environment. R. C. LEWONTIN 494
Natural Selection in Water Snakes (*Natrix sipedon* L.) on Islands in Lake Erie. JOSEPH H. CAMIN and PAUL R. EHRLICH 504
A Conspectus of Hybridization in the Orchidaceae. HELEN ADAMS and EDGAR ANDERSON 512
Eye Pigment Relationships in Three Species Groups of Drosophila. D. J. NOLTE 519
The Average Effect of Radiation-Induced Mutations on Viability in *Drosophila melanogaster*. BRUCE WALLACE 532
Notes and Comments
300 Species of Drosophila in Hawaii?—A Challenge to Geneticists and Evolutionists. ELWOOD C. ZIMMERMAN 557
Morphological Integration. JOHN IMBRIE 558
Report on the Thirteenth Annual Meeting of the Society for the Study of Evolution. HARLAN LEWIS 560
Index for Volume XII vi

INDEX TO VOLUME XII, 1958

accelerated selection, sparse populations, 258
Adams, H., 512–518
adaptations, biological for mate finding, 255; numerical, spatial, temporal, 253–255
adaptive, approach in genera definition, 375–381; polymorphism, 234–245; value of legionary behavior, 29–30; values; of genotypes, 18–23, estimation of, 241–244
African ranids, 380–381
albedo, 354–356
Allomys, 459 (fig.)
allopatric populations, spadefoots, 311–318
Ameniscomys selenoides, 453
American *Bison,* blood groups, 102–110
Anderson, E., 512–518
angiosperms, origin and phylogeny, 266–270
animal populations, rare matings, 246–261
annual meeting, S.S.E., report, 560–562
Ansonia muelleri, 376 (fig. larva), 377 (fig.)
Anthophoridae, 219–223
Aplodontia rufa, 455, 456 (fig.)
Aplodontidae, 451–459
apogamy, ferns, 137–138
army ants, 25–28
Artiodactyla, 57
Ascaphus, tadpole, 378 (fig.)
asexual reproduction, factors of evolution, 402
Australian frogs, evolution, 224–233
Baker, H. G., 423–427
balanced polymorphism, *Tisbe reticulata,* 358–364
bat, fauna, 431; distribution of genera and species, 429–439 (tbl. 432)
batrachian, *Lepidobatrachus asper,* 166–172 (fig.), 168
bats, new records and taxonomic problems, 436–438
Battus philenor, 123–136
bees, significance of floral constancy, 219–223
behavior, birds in butterfly mimicry experiments, 131, 280–281
biogeography, aplodontid and mylagaulid rodents, 451–484
biological, factor in cultural evolution, 206-210; family, 194
Birdsell, J. B., 189–205
birds, experimental in butterfly mimicry studies, 277–279
Bison, 102–110
blood groups, *Bison,* 102–110
Booth, A. H., 48–62
box turtles, rare encounters, 247–250
Britton, D. M., 137–145
Brower, J. V. Z., 32–47, 123–136, 273–285
Brown, W. L., Jr., 211–218
buffalo, 102–110
Bufo bufo gargarizans, 376 (fig.)
bufonids, Malaysian, 379–380
butterflies, geographic distribution, 38–39; mimicry, 32–47; 123–136; 273–285
Camin, J. C., 504–511
Carica, crossing relationship, 263–266
Caryophyllaceae, hybridization, 423–427
cattalo, 108
caudal fin, 116–118
Cei, J. M., 166–172
Ceylon, *Pteris,* 82–92
Chiroptera, distribution, 429–439
chromosomal, adaptive polymorphism, 234–245; composition, *Trillium,* geographical distribution, 303–305 (map), populations, 301 (tbl.); variation in natural populations, *Trillium kamtschaticum,* 246–303
chromosome, frequencies, 20 (fig.); numbers, in *Colchicum,* 173–188 in *Pellaea,* 139 (tbl.); studies in *Trillium,* 283–310
chromosomes, arrangements in *Clarkia,* 321–324 (fig.); frequency third with PP arrangement in *Drosophila pseudoobscura,* 388 Clarke, B., 418–419
Clarkia, amoena, 311; breeding habits of species, 319–321; chromosome arrangements, 321–324; *franciscana,* 319; interspecific hybrids, 324–328; intraspecific fertility, 321–324; morphological differentiation of species, 319–321; rapid evolution in, 319–338; *rubicunda,* 311; spatial relations of species, 319–321
Coccidea, 115
Co-evolution, obligate parasites and hosts, 158–165
Co-existence, 112
Colchicum, chromosome: geography, 182–183, numbers and evolution, 173–188; distribution figures, 174–176; somatic metaphase, 177
collecting populations, man, 189–205
competition, in plants and animals, 93–101
contacts, local groups, 197 (fig.)
control birds, butterfly mimicry, 129–131
copepod, *Tisbe reticulata,* 358–364
Cowles, R., 347–357, 417–418, 419–420
Crinia, 224–233; species, 224–226 (fig., tbl.)
Crocuta, c. crocuta, sivalensis, spelaea, ultima, 146–151
crosses, *Tisbe,* 360–363 (fig., tbl.)
cultural evolution, 206-210
Cynips, 7–10
cytotaxonomic studies, *Pellaea,* 137–145; *Pteris,* 82
Dahomony gap, as geographic barrier, 48–62
Danaus, gilippus berenice, 237–85; *plexippus,* 32–47
dark phase, fire ant, 212–216 (figs. tbl.)
Darlington, P. J., 270–271
dermal, temperature regulation, origin, 347–357; vascularity, Amphibia, 347
dermovascular flow, 351–354

detecting range, relative, *Odocoileus virginianus, Plethodon cinereus, Terrapene orata,* 252 (figs).
Diadasia, 219–223
Diaspidae, 115
differentiation index, 146–157
dioecious Caryophyllaceae, 423–427
Dipsosaurus, 350–354 (figs.)
disease resistance, in plants, 158
dispersal, long-distance, 421–422
Dobzhansky, Th., 18–23, 385–401, 418, 419
Drosophila, athabasca, 72–81; distribution of South African strains, 521 (fig.); eye-pigment relationships, 519–531; isolating mechanism, 485–493; *melanogaster,* 18, 93–101, 532–556, melanogaster group, 519; obscura group, 519; radiation-induced mutations, 532–556; *persimilis,* 234–243; *pseudoobscura,* 18–23, 113, 385–401, 496–503; strains of South African species, 520 (tbl.); species in Hawaii, 557–558; willistoni group, 519
Eastern Nigeria, 49 (fig.)
ecological niche, 111
ecology, in bat distribution, 429–439; *Paramecium,* 440– 450
ecotherm, 349
egg-laying capacity, *Drosophila persimilis,* 236–239
Ehrlich, P. R., 504–511
endotherm, 349
Epigaulus minor, 464 (fig.), 465–466
Epling, C., 398–400
Erythroneura, 111, 113, 337–346; *alicia,* 339–341 (fig.), *arpegia,* 341–342 (fig.), *incondita,* 342–343 (fig.), male genitalia, 341–344 (figs.); maculata group, 338 (fig.); *metopia,* 339 (fig.) phyletic lines, 337–344; *triangulata,* 343–344 (fig.); *Trivittata,* 339 (fig.)
evolution, aplodontidand mylaganlid rodents, 451–484; genera of Australian frogs, 224–233; *Trillium,* 63–71, 286–310
evolutionary, rates, measurements of, 146–157; significance of rare matings, 246–261
experimental animals, validity of, 348–349; studies, migration in *Drosophila,* 93–101
eye histology, 520
eye–pigment, relationships in *Drosophila,* 519–531
factors, cultural cohesion, 194–197
Feinbrun, N., 173–188
Felis (*Lynx*), growth patterns, 153
ferns, *Pellaea,* 137–145
fins, 116–118
fire ant, geographic distribution, 212 (fig.); recent changes, 211–218
flax, 158; rust, 159
floral constancy, among bees, 219–223
Gaboon, 49 (fig.)
gametophytes, *Pellaea,* 141 (fig.)
gene pool, composition, 18–23
genera, definition of, 370–384
genetalia, male, *Erythroneura,* 341–344 (fig.)
genetic, basis of variation in fire ant, 212; drift, 418–419; frequencies, 114
genetics of pathogenicity, 158
genome and polyploidy, in *Trillium,* 289–290
genomes, differentiation in *Trillium,* 286–289
genotypes, adaptive values, 18–23
geographic, distribution: butterflies, 124–125, 274; Japanese Trilliaceae, 292 (tbl.); vertebrates, 270–271; water snakes, 507–508; isolation, *Lepidobatrachus asper,* 166–172; range, *Plethodon cinereus, terrapene ornata, Odocoilius virginianus,* 252 (figs.); variation, water snakes, 506–507
Gloger's rule, 354
Gold Coast, 50 (fig. 49)
group-predatory behavior, ponerine ants, 24–31
habitat selection, sparse population, 256–257
Hairston, N. G., 440–450
haplodiploidy, 115
Heleioporus, 224–233; species, 227–228 (fig.)
herding, in sparse populations, 255
hermaphrodite, species of Caryophyllaceae, 423–427
heterosis, in constant environment, 494–503; *Paramecium aurelia,* 402–416
heterotic system, origin of, 494–495
heterozygosity, 494–503
heterozygotes, *Tisbe,* 360–363
Hiraizumi, Y., 93–101
homeostasis, 499–503
homological relationships, genomes in *Trillium,* 290 (fig.)
host-pathogen system, model, 160–163
host resistance, 158
hosts and obligate parasites, 152–165
hunting populations, man, 189–205
Hyaena, evolution of, 146–151
hybrid, origin of angiosperms, 267–270; vigor, *Paramecium aurelia,* 402–416
hybridization, dioecius and hermaphroditic species, Caryophyllaceae, 423–427; leaf hopper species, 337–346; Orchidaceae, 512–518; *Pteris,* 82–92
hybrids, interspecific in *Clarkia,* 324–328 (fig.); orchids, lists: interspecific, intergeneric, trigeneric, tetra-generic, 515 (tbl.) 516–517 (figs.)
hydrofoil, 116
Hyla versicolor, 254
Hymenoptera, 219–223
Hyracoidea, 57
Imbrie, J., 558–559
inbred lines, *Drosophila melanogaster,* 489–490 (tbl.)
Inger, R., 365, 370–384, 414
insular faunas, zoogeography, 429
insulation in ecothermy, 349–351
interaction, species of *Solenopsis,* 217–218
Interfluvial fauna, 55
intragenomic differentiation, *Trillium,* 294–296
intraspecific fertility, *Clarkia,* 321–324

interspecific, hybrids, *Trillium,* 287 (tbl.); relationships, *Paramecium,* 445–446
inversion frequency, 113
Irwin, M. R., 102–110
isogenic lines, *Drosophila melanogaster,* 489, 491 (tbl.)
isolation, sexual, 72–81
Iyama, S., 93–101
Jamaica, bat genera, 435 (tbl.)
Japanese *Trillium,* 286–310
Johnson, R. G., 270–271
Koopman, K. F., 429–439
Krynine, P. D., 366
Kurabayashi, M., 286–310
Kurtén, B., 146–157
Lake Erie islands, 505, 506 (fig.)
landbridges, 429–439
leafhopper species, hybrid origin 337–346; phyletic lines, 337–344 (fig.)
Lee, A. K., 224–233
legionary behavior, adaptive value, 29–30; early evolutionary stages, 30–31
Lepidobatrachus asper, geographic distribution, 167 (fig.); morphology, 167 (fig.); 170, 171 (tbl.); populations, 166–172
Leptogenys, diminuta, 25–26; *purpurea,* 27–28 (fig.)
Levene, H., 18–23
Lewis, H., 120–122, 319–338, 560–562
Lewontin, R. C., 494
Liberia, 49–50 (fig.)
life cycle, components in *Drosophila persimilis,* 234–243
Limenitis archippus archippus, 32–47; *archippus floridensis,* 273–285
Lindroth, C. H., 422
linkage, genes of disease resistance, 163–164
Linsley, E. G., 219–223
Liodontia alexandrae, 454; *furlong;* 454
Littlejohn, M. J., 224–233
loon wing, 262–263
Love, A., 421–422
MacSwain, J. W., 219–223
Main, A. R., 224–233
Malayan bufonids, 379–380
mating behavior, *Drosophila athabasca,* 72–81
Megaponera foetans, 28
Meniscomys hippodus, 460–461 (fig.)
Mesogaulus cf. *pristinus,* 461–462
Michener, C. D., 371
migration, Australian frogs, 230 (fig.)
Miller, D. D., 72–81
Miller, R. L., 558–559
mimicry experiments on butterflies, 32–47, 123–136, 273–285, summary, 283–284
Mode, C. J., 158–165
models, genetic structure of populations, 534–537 (fig.)
monarch butterfly, 32–47
morphological, integration, 558–559; relations of *Quercus gambelii* and *margaretta,* 2–7 (figs.)
morphology, *Lepidobatrachus asper,* 166–171 (fig.)
Mosiman, J. E., 246–261
Muller, C. H., 1–17
mylagaulid rodents, evolution and biogeography, 451–484
Mylagaulidae, 459–475; Arikareean, 460–461; Barstovian, 461–464; Clarendonian, 464–466; developmental trends of fourth premolars, 466–470 (tbl.) (fig.); Hemphillian, 466, historical biogeography, 474–481, maps; hypsodonty and size, 470–475 (tbls.) (fig.); variations in wear patterns, 462–467 (figs.)
Mylagaulodon angulatus, 461
Mylagaulus cf. *laevis,* 463–464; cf. *monodon,* 466
Narise, T., 93–101
Natrix sipedon, geographic variation, 506–507; natural selection, 504–511
natural, coexistance, 111–112; populations: genetics of, 385–401; low density considerations, 231–253; *Trillium,* 63–71; *Kamtschaticum,* 296–303, selection: 418–419; water snakes, 504–511
Neobatrachus, 224–233; species, 226–227 (fig.)
Niches, 112
Niger, as geographic barrier, 48–62
Nolte, D. J., 519–531
nomadic behavior, ponerine ants, 24–31
nomenclature, aplodontid teeth, 452 (fig.); mylagaulid teeth, 460 (fig.)
non-adaptive characters, in generic definition, 382–383
North America butterflies, 32–47
Nursall, J. R., 116–118
Nygren, A., 423–427
oak gall wasp, *Cynips,* 7–10
obligate parasites, 158–165
Odocoileus virginianus, geographic and detecting range, 252 (fig.)
Old Red Sandstone, 365–366
Olson, E. C., 558–559
Onychomyrmex, 28
Orchidaceae, hybridization, 512–518
origin, angiosperms, 266–270; tetrapods, 419–420
Owen, R. D., 102–110
Papilio glaucus, troilus, 123–136
Paramecium aurelia, 442; caudatum, 442; ecology, 440–450; hybrid vigor and heterosis, 442–446; *Jenningsi,* 449; *multimicronucleatum*
parasites, 158–165
Pavlovsky, O., 18–23, 418–419
Pellaea, 137–145; distribution 142, 143 (figs.)
Phalanger ursinus, growth patterns, 152
phenotype, eye, 50
phenotypic constitution, *Lepidobatrachus* asper, 166–172
phyletic lines, *Erythroneura,* 337–344 (figs.)
phylogeny, angiosperms, 266–270
pigment, eye in *Drosophila,* 519–531

Plethodon cinercus, geographic and detecting range, 252 (fig.)
polymorphism, loss of, 495–496; maintenance, 496–497
polyploidy, and genome in *Trillium,* 289–290
Ponderosa pine zone, birds, and mamals, 10-12
ponerine ants, 24–31
Popov, M. O., 266–270
populations, cage conditions, 234–243; dynamics in hunting and collecting populations of man, 192–194; introduced fire ant, 211–218; rare matings, 246–261; size in *Paramecium,* 443–444; structure in hunting and collecting populations of man, 189–205
primates, 56
program, 13th Annual Meeting S.S.E., 561–562
Pseudaplodon asiatica, 457
Pteris, 82–92; *confusa,* 88; *multiaurita,* 87–89 (fig.); *otaria,* hybrid nature, 83–86 (figs.); *quadriaurita,* 87–88; quadriaurita complex, taxonomic history, 83
Quercus gambelii and *margaretta,* 1–17; edaphic preferences, 13–14
radiation-induced mutations, effect on viability, 532–556
Rana grylio, 254; *limnocharis,* 376 (fig.)
ranids, African, 380–381
rapid evolution, *Clarkia,* 319–338
rare matings, 246–261
rates, of development, *Drosophila persimilis,* 239–241; of evolution, 154–155
Raven, P. H., 319–338
report, 13th Annual Meeting S.S.E., 560–562
rodents, aplodontid and mylagaulid, 451–484
Romer, A. S., 365–369
Ross, H. H., 112, 337–346
Ruibal, R., 417
Sakai, K., 93–101
Samejima, K., 63–71
Santibanez, S. Koref, 485–493
Sauromalus, 350–351 (fig.)
Savage, J. M., 111–112
Savile, D. B. O., 263
Sawant, A. C., 263–266
Scaphiopus, 311–318; crossbreeding experiments, 313–316; geographic distribution of species, 311–313; *h. holbrooki, h. hurteri,* 311; relationships allopatric populations, 311–318; skulls, 314 (fig.)
Sciuridon, 453
Sciuromorpha, 56
scrotum, evolutionary significance, 417–418
scrub jays, behavior, 42; learning and memory, 42–43
selection, accelerated in spare populations, 258; lines, from Kaduna wild type, *Drosophila melanogaster* 486–489 (tbl.); natural in fire ant, 216–217
selective elimination, water snakes, 507–509
Sewelleladon predontia n.g. and n.sp., 452 (fig.)
sexual isolation, 72–81; different lines in a species, 485–493
Shotwell, J. A., 451–454
Siegel, R. W., 402–416
Simopelta, 29
Social equilibrium, 196; rates of band interaction, 200–204 (fig.)
Society for the Study of Evolution, 12th Annual Meeting, 120–122; 13th Annual Meeting, 560–562
Sokal, R. S., 371
Solenopsis saevissima, 211–218
somatic metaphase, *Colchicum,* 177–180 (fig.)
South America, costal islands, 430 (map), 431 (classification)
spadefoots, 311–318; relationships, allopatric populations, geographical distribution of *Scaphiopus h. holbrooki; h. hurteri,* 311–313 (map); crossbreeding tests, 313–316
sparsity, evolutionary significance, 255
spatial effects on band social interactions, man, 197–200 (figs.)
speciation by polyploidy, *Trillium,* 290–294 (fig.)
species, problem in *Paramecium,* 440–450; sexual isolation within lines, 485–493
Spiess, E. B., 234–243
spread of populations, fire ant, 211–212
Staurois mantzarum, 276–277 (figs.)
Stebbins, G. L., 266–270
Steward, J. H., 206–210
Storer, R. W., 262
Stourmont, C., 102–110
Syngen, 446–449
tadpoles, Bufonidae and Ranidae compared, 376 (fig.)
Tardontia occidentale n.g., 455, 457 (fig.); cf. *occidentale,* 455; *nevadans* n.sp., 456
taxonomic differentiation in growth patterns, 151–152
temperature, origin of regulation, 347–357; relationships in *Paramecium,* 444
Terrapene, carolina, random encounters, 247–250; *ornata,* geographic and detecting range, 252 (fig.)
territoriality, hunting and collecting populations, man, 190–192
tetrapod, early life, 365–369; limbs, 363–369; origin of, 419–420
Tisbe reticulata, balanced polymorphism, 358–364; crosses, 360–362 (tbl.) variations in color patterns, 358–360 (fig.)
Togoland, 49 (fig.)
transatlantic connections, 421–422
tribe, 194
Trilliaceae, Japanese, geographic distribution 242 (tbl.)
Trillium, 286–310; chromosomal: composition, 303–305 (map), variation, 296–303; evolution and variation, 63–71; gene frequency changes, 302 (fig.); genome and polyploidy, 288–290; geographical differentiation, 303; intragenomic differentiation, 244–296; *Kamtschaticum,* 63–71; natural populations, 64 (fig.) speciation by polyploidy, 290–294

Tryon, A. F., 137–145
Tucker, J. M., 1–17
typological methods, genera determinations, 371–373
variation, color patterns in natural populations, *Tisbe reticulata* 358–360 (fig.); *Drosophila athabasca,* 72–81; genetic basics in fire ant, 212; *Trillium,* 63–71, 72–81
vertebrates, geographical distribution, 270–271
viability, effect of radiation-induced mutations on, 532–556
viceroy butterfly, 32–47
Volta, as geographic barrier, 48–62
Waddington, C. H., 485–493
Walker, T. G., 82–92
Wallace, B., 113, 532–556
Wasserman, A. O., 311–318
water snakes, natural selection, 504–511
weighting of characters, in generic definition, 373–375
West Africa, 49 (fig.)
Western Nigeria, 49 (fig.)
Williamson, M., 418–419
Wilson, E. O., 24–31; 211–218
worker, ponerine ant, 28 (fig.)
Zimmerman, E. C., 557–558
zoogeographic regions, Australia, 228 (fig.)
zoogeography, insular faunas, 429